
بسم الله الرحمن الرحيم

SPRUING



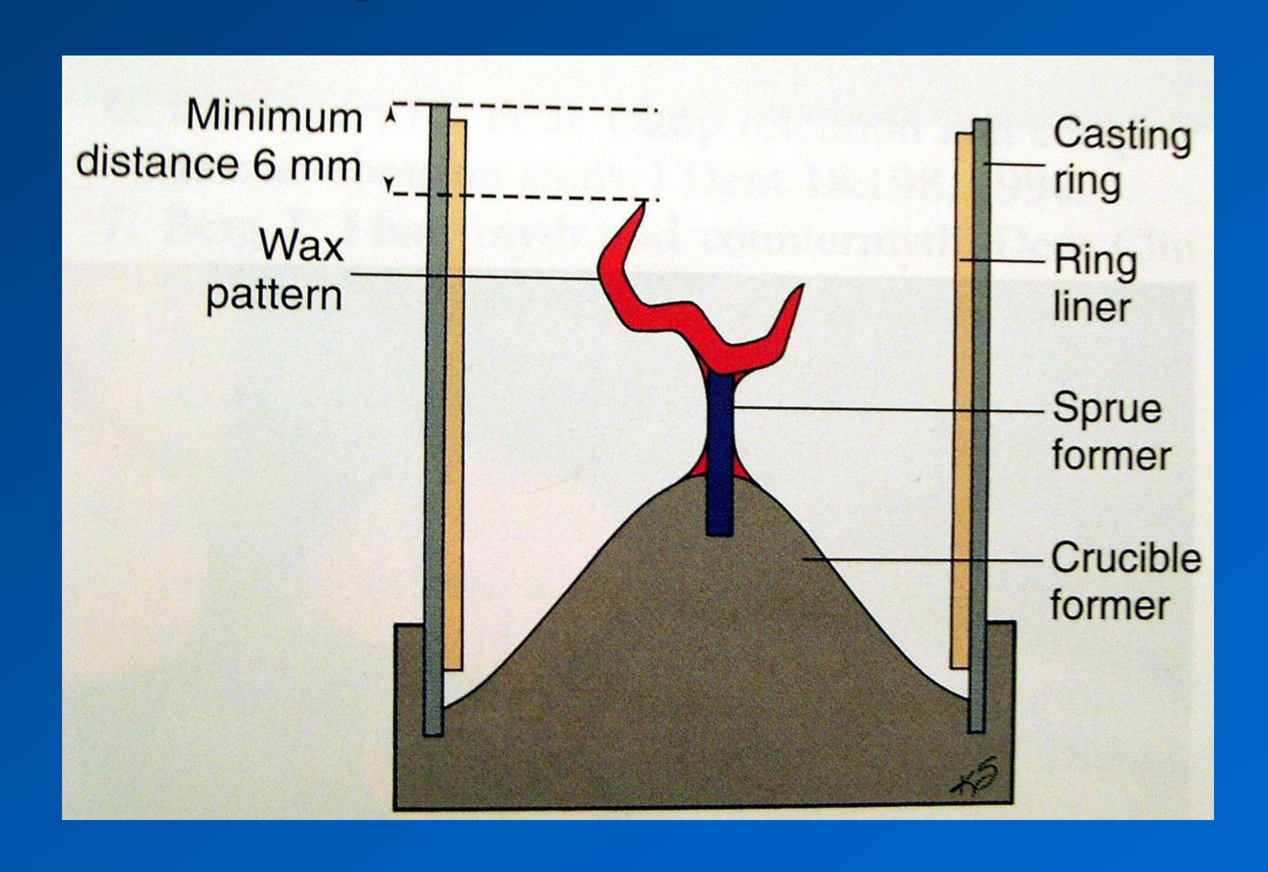
Presented by

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- ☺ **The process of casting consists of surrounding the wax pattern with a mold made of heat resistant investment material, eliminting the wax by heating, and then introducing molten metal into the mold through a channel called the sprue.**

- ***Sprue former*** *provides a channel in the investment material. Through this sprue channel molten wax can escape during the burnout process, and molten metal can reach the mold cavity.*

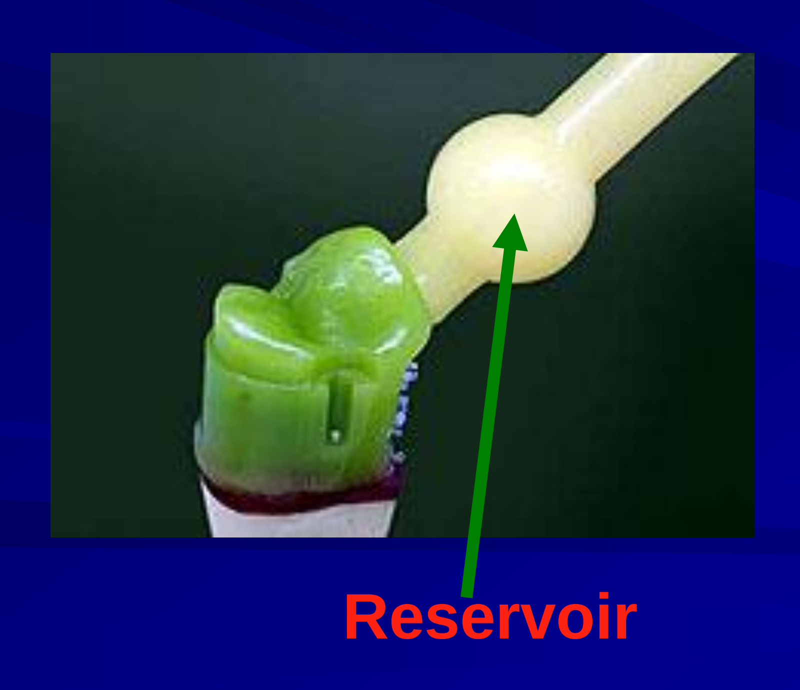


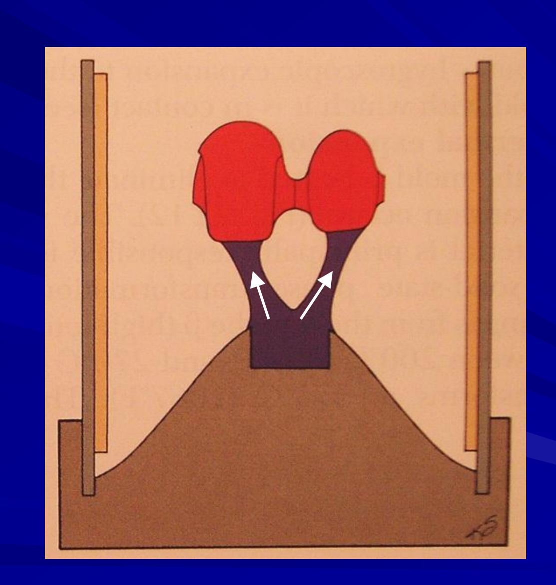
- ***Basic requirements of the sprue former:***

1. **Allow the molten wax to escape from the mold.**
2. **Enable the molten metal to flow into the mold.**
3. **The metal within it must remain molten slightly longer than the alloy that has filled the mold.**

Spruing methods:

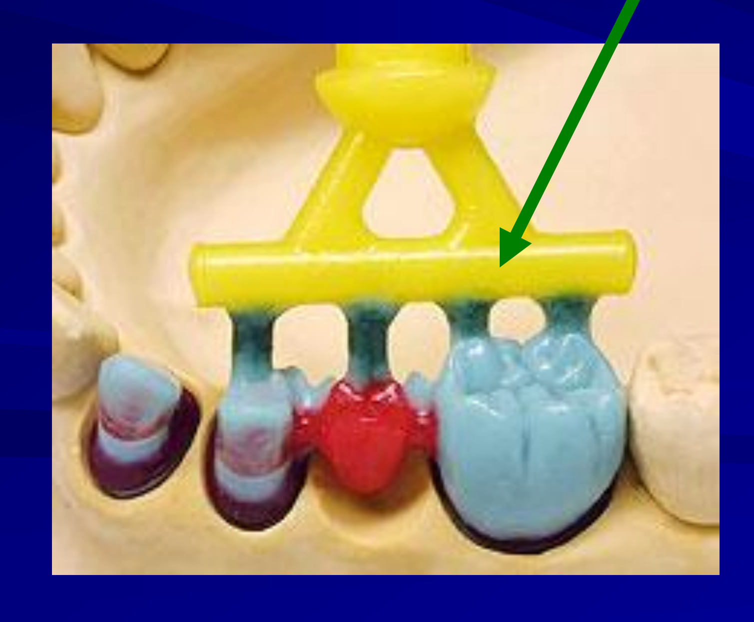
- **Direct** sprue directed towards the pattern without any deviations

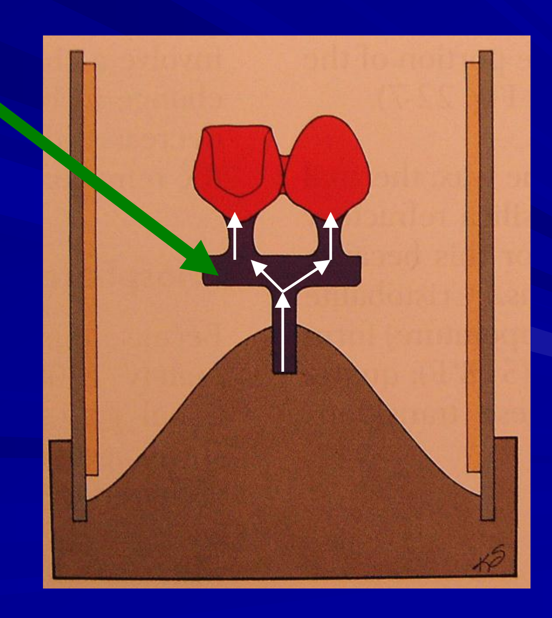




Spruing methods:

- **Indirect** sprue goes through different angles along its path towards the pattern (using a runner bar)





Types of sprue formers

- Wax sprue former (preferred).
- Plastic sprue former:

1. Solid
2. Hollow

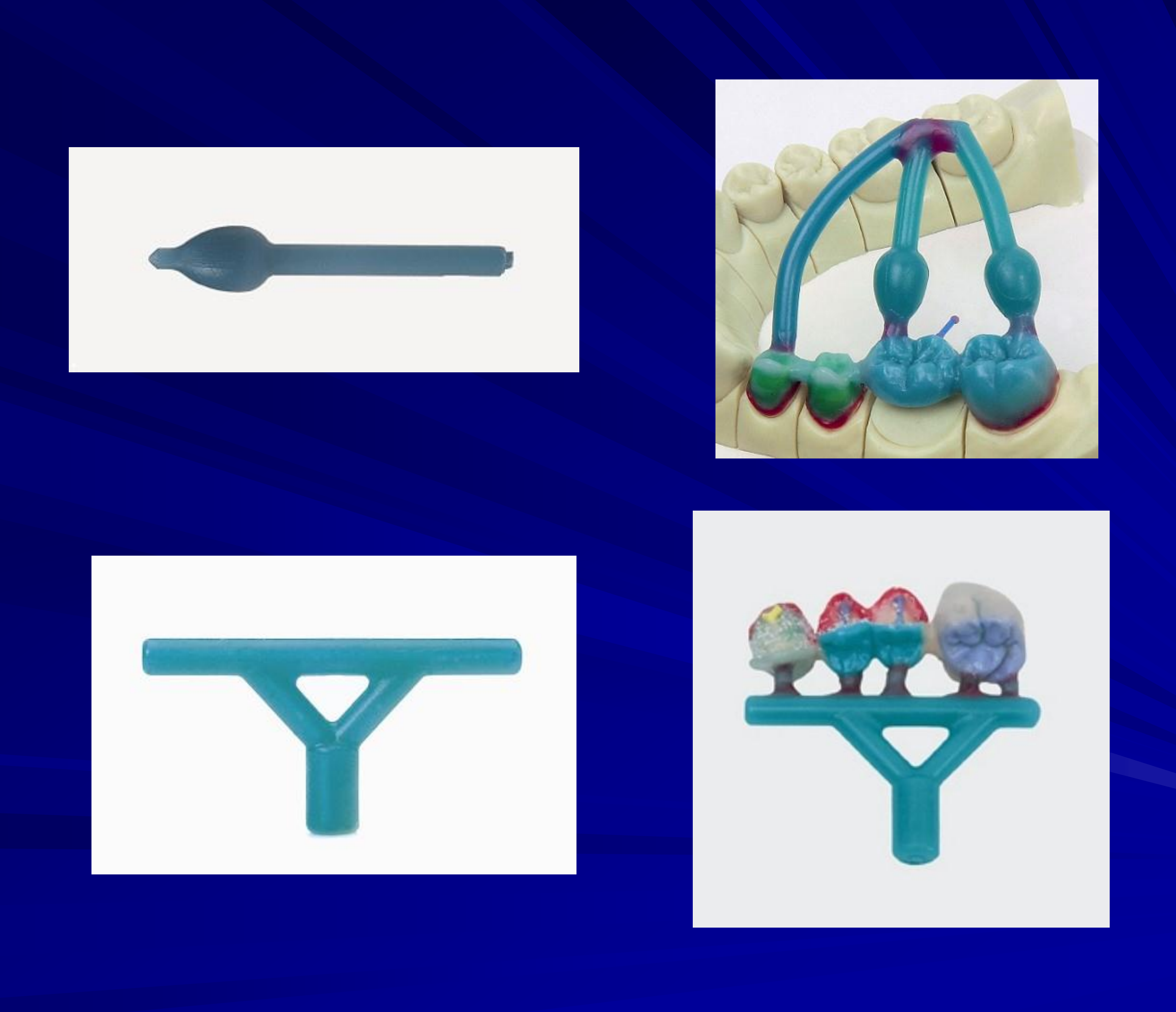
- Metallic sprue former:

1. Solid
2. Hollow

- ***Wax sprue former***







- ***Plastic sprue former***





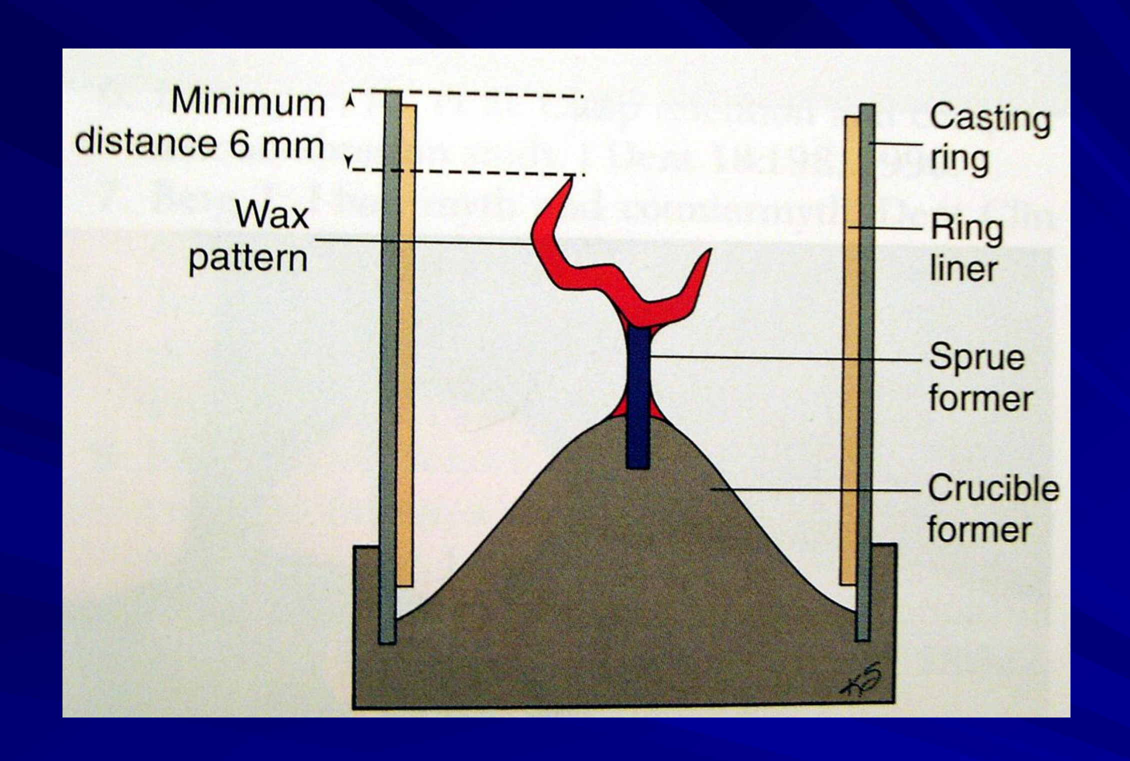


Sprue former diameter

- A relatively large-diameter sprue is recommended because this improves the flow of molten metal into the mold and ensures a reservoir during solidification.

- A narrow sprue is essential with air-pressure casting machines where a sudden change in air pressure occure. The molten metal is prevented from flowing into the mold prematurely.

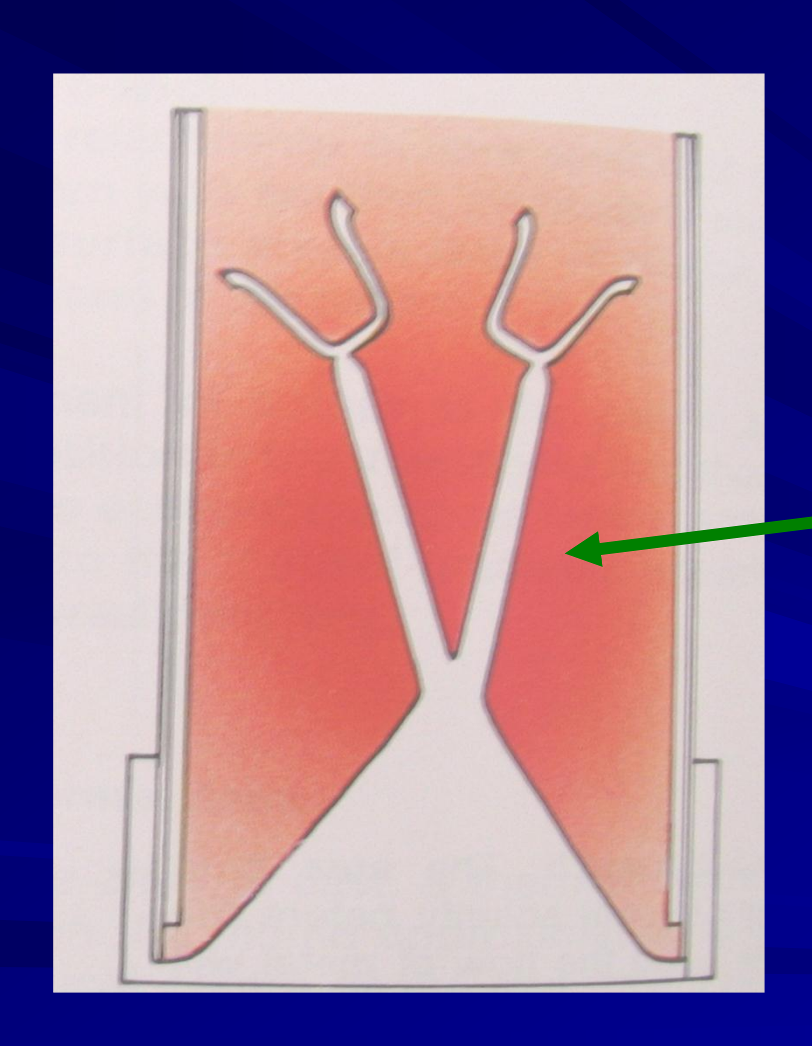
Sprue former length Average 6 mm



- **Distance between pattern and ring top**

  gypsum-bonded investment -------- 6-8 mm

  phosphate-bonded investment ----- 3-4 mm

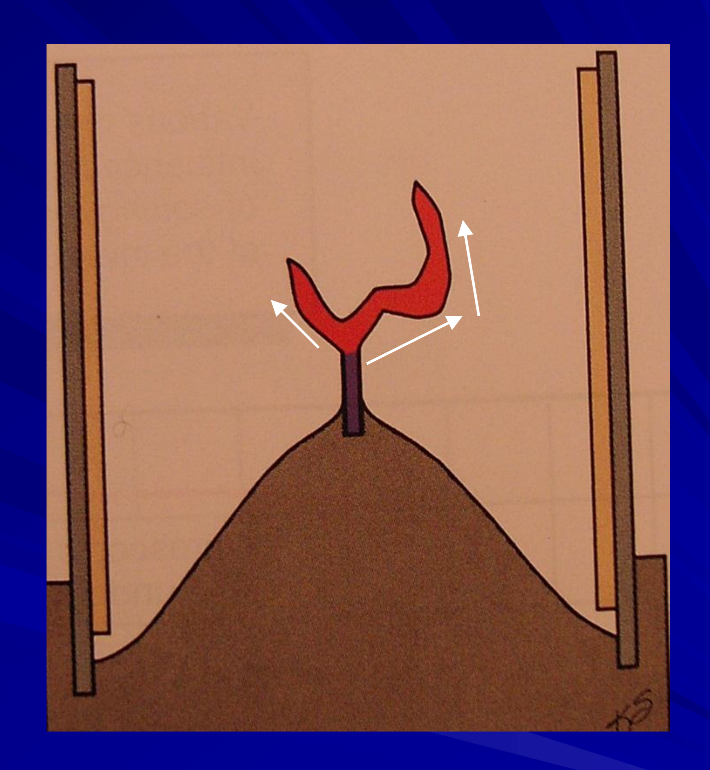


Thermal zone

Sprue former location

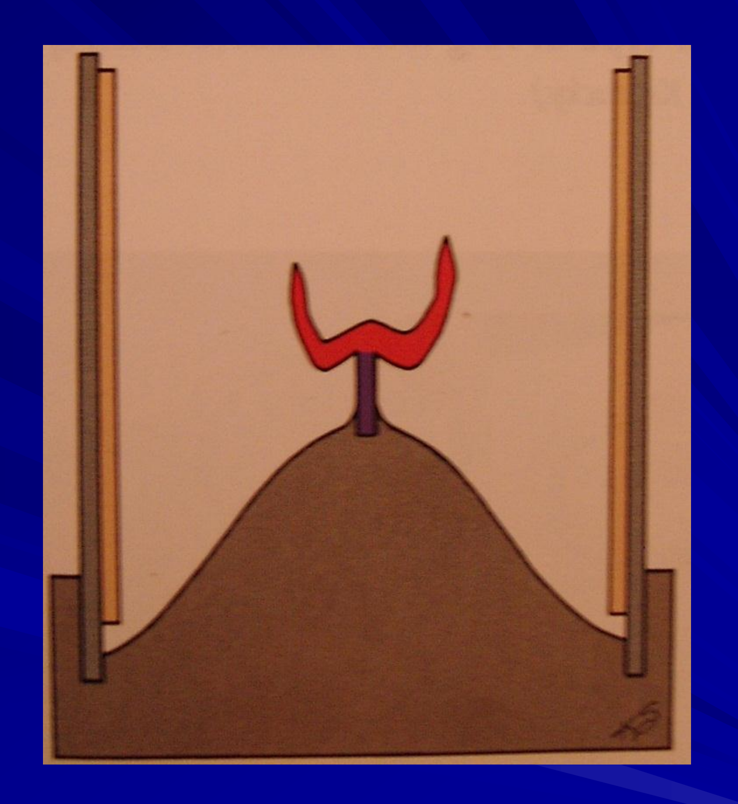
-The sprue should be attached to the bulkiest part of the pattern (nonfunctional cusp).

-The point of attachment should permit a stream of metal to be directed to all parts of the Mold.



Sprue former location

Incorrect sprue placement in the central fossa obliterates occlusal anatomy and may result in poor mold filling.



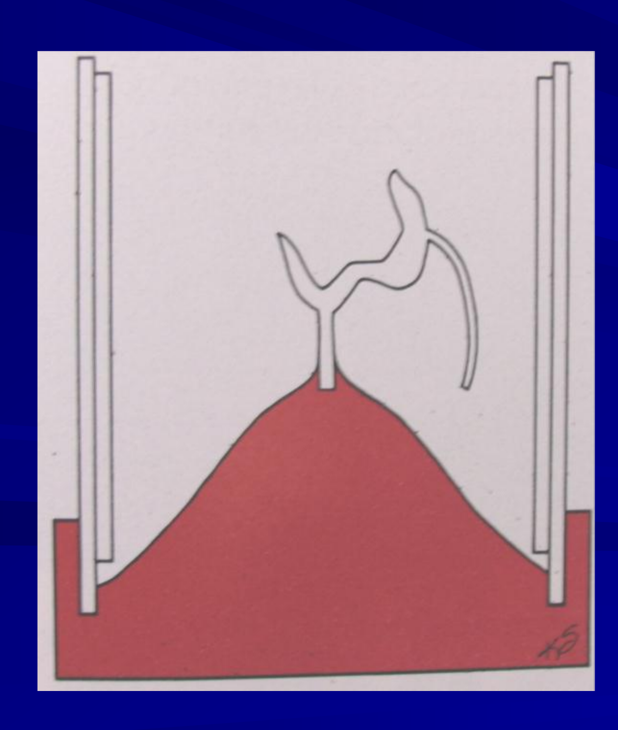


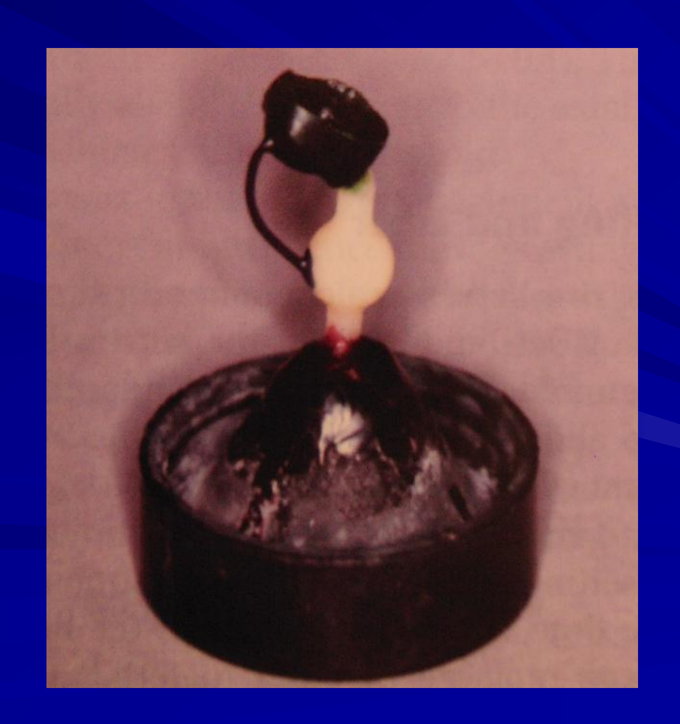
Number of sprue former

- Single spruing
- Double spruing
- Multiple spruing

Venting

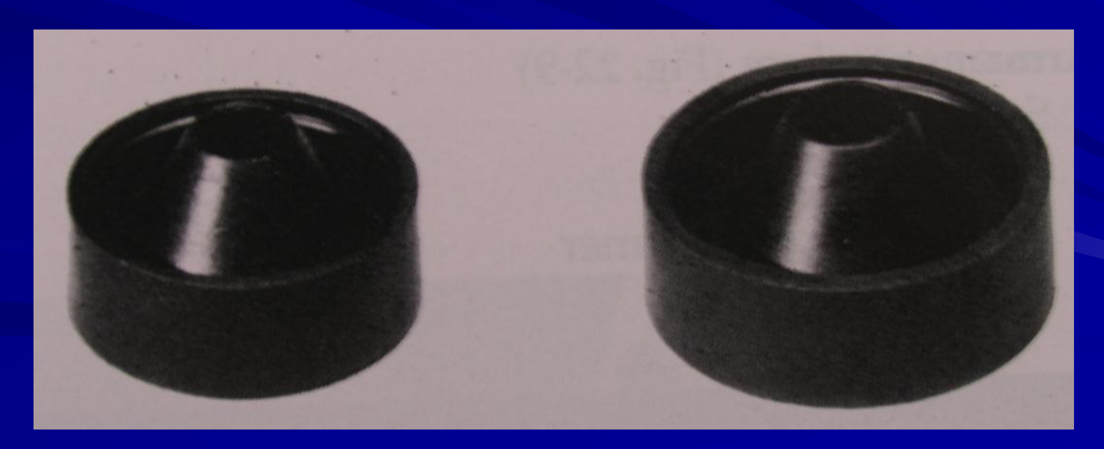
The thin auxiliary sprue may help gases escape and ensure the casting solidifies in a critical area.





Crucible Former

- ☺ The sprue is attached to a crucible former, usually made of rubber, which constitutes the base of the **casting ring** during investing.
- ☺ It provides a funnel to facilitate entrance of molten alloy



Casting ring holds investment in place and restricts expansion



Ring liner allows for hygroscopic expansion, venting, facilitates removal of investment, and directs expansion outwards







RINGLESS INVESTMENT TECHNIQUE

- Use higher-strength, phosphate-bonded investments.
- It is designed to allow unrestricted expansion of the alloys of higher melting temperature to compensate for high shrinkage.

Plastic ring





SPRUING TECHNIQUE
for a single casting

1.Attach a wax sprue to the bulkiest nonfunctional cusp of the wax pattern, and angle it to facilitates filling of the mold.



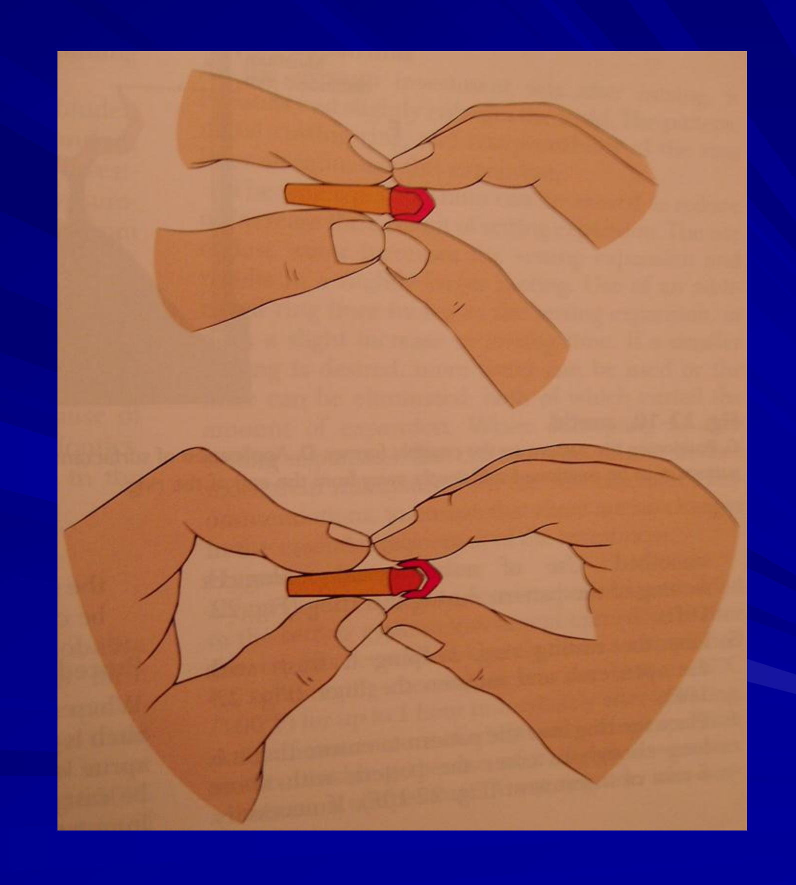
SPRUING TECHNIQUE
for a single casting

2. Add wax to the point of attachment and smooth it to prevent turbulence during casting.



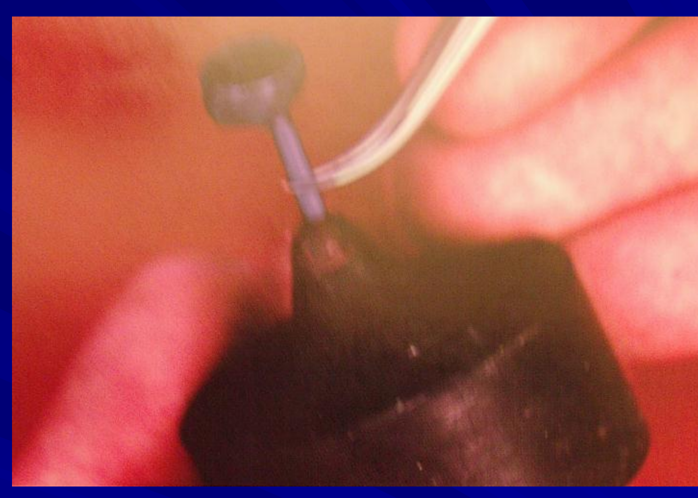
SPRUING TECHNIQUE
for a single casting

3. Remove the pattern from the die, using extreme caution not to distort it by bending the fingers of the left hand.



SPRUING TECHNIQUE
for a single casting

4 - Insert the sprue into the hole in the crucible former with forceps and lute with wax which should be smoothed.

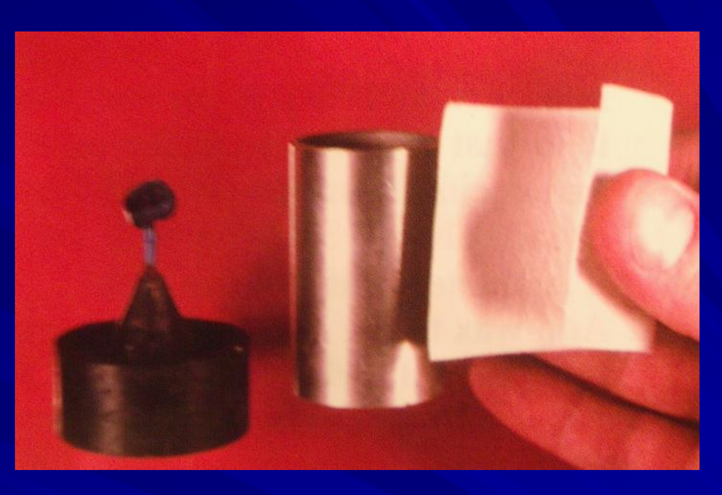


- Use of a surfactant greatly enhances wetting of the pattern during investing

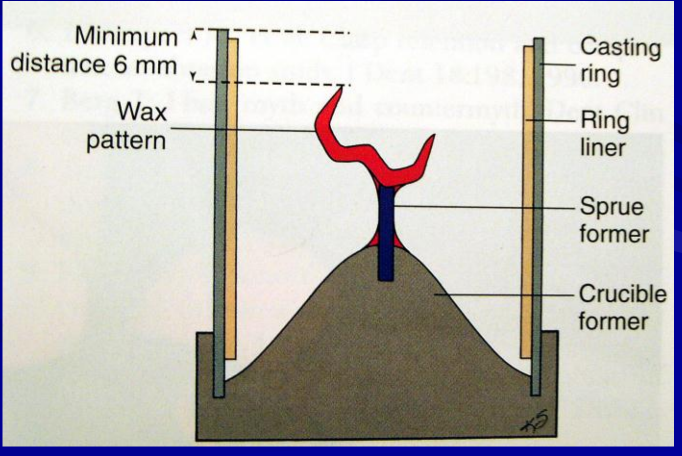


SPRUING TECHNIQUE
for a single casting

5. Line the casting ring, keeping it flush with the open end, and moisten the liner.



6. Place the ring over the pattern to ensure it is sufficiently long to cover the pattern with about 6 mm of investment.



SPRUING TECHNIQUE
for multiple castings

- When more than two units are being cast together, each is joined to a runner bar.
A single sprue is used to feed the runner bar.



THANK YOU